Summary of Quality Control Samples and the Information They Provide

Data Quality Indicator	QC Check and QC Sample	Sources of Measurement Error										Purpose
		Sample Collection				Sample Transport	Laboratory/Field Analytical Method					To evaluate or determine the source of measurement error arising from:
		Sampling Equipment	Conditions During Sampling	Preservation Technique	Sampling Matrix	Shipment Process	Sample Storage at Laboratory	Sample Preparation Reagents	Sample Preparation Equipment	Analytical Methods Reagents/ Standards	Analytical Equipment	
Accuracy/Bias (Positive bias introduced by contamination)	Equipment Blank (Rinsate Blank)	✓✓		✓		✓ (VOCs)	✓	✓✓	✓✓	✓✓	✓✓	Carryover contamination resulting from successive use of sampling equipment. Also see preparation blank.
	Pour Blank (Ambient, or Field Blank)		✓✓	✓		✓ (VOCs)	✓	✓✓	✓✓	✓✓	✓✓	Ambient contamination of sample during sampling exercise (e.g., sand blowing into a water-metals sample, or high concentration of volatiles in air). Also see preparation blank.
	Volatile Organic, or Radiological (Radon) Trip Blank					✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	Contamination introduced during shipment. Usually limited to VOCs and radiological parameters such as radon. Also see preparation blank.
	Volatile Organic Storage Blank (Refrigerator blank)						✓✓			✓	✓	Cross contamination introduced during sample storage usually for VOCs. Also may be used for radon, tritium.
	Reagent Blank (one per lot number)			✓✓				✓	✓	✓	✓	Contamination introduced by reagents used as sample preservatives.
	Preparation Blank							✓✓	✓✓	✓✓	✓✓	Contamination introduced by preparation process, glassware, analytical reagents, and analytical instrumentation.
	Instrument (System) Blank										✓✓	Contamination originating with the analytical equipment.
Accuracy/Bias (Bias due to inadequate temperature control)	Cooler Temperature Blank			✓✓		✓✓						Inadequate temperature control during shipping leading to potential loss of target analytes.

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Accuracy/Bias (Bias due to sample matrix or sample preparation/ analytical methodology/ operator error)	Matrix Spike				✓✓			✓	✓	✓	✓	Preparatory and analytical bias for specific compounds in specific sample matrices.
	Surrogate Spike				✓✓			✓	✓	✓	✓	Preparatory and analytical bias in specific sample matrices.
	Laboratory Control Samples							✓✓	✓✓	✓✓	✓✓	Laboratory's ability to accurately identify and quantitate target compounds in a reference matrix at a known concentration.
	Performance Evaluation Sample- Ampule Single Blind							✓✓	✓✓	✓✓	✓✓	Laboratory's ability to accurately identify and quantitate target compounds.
	Performance Evaluation Full Volume-Double Blind Prepared in Site-specific Matrix				✓✓		✓✓	✓✓	✓✓	✓✓	✓✓	Laboratory's ability to accurately identify and quantitate target compounds in a reference matrix.
	Laboratory Fortified Blank							✓✓	✓✓	✓✓	✓✓	Method preparatory and analytical sensitivity and bias for specific compounds in a reference matrix at the quantitation limit.
	Initial Calibration									✓✓	✓✓	Sets the response to a known concentration to ensure the instrument will produce acceptable quantitative data.
	Continuing Calibration & Verification									✓✓	✓✓	Checks the accuracy and stability of the instrument response.
	Instrument Performance Check Sample									✓✓	✓✓	Checks that an instrument can accurately identify and quantitate target analytes at specific concentration levels.

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Accuracy/Bias (Bias due to methodology)	Field Splits (Homogenized Samples)							✓✓	✓✓	✓✓	✓✓	Comparability of results between two methods, or laboratories (e.g., field and fixed).
	Field Splits (extracts)							✓✓	✓✓	✓✓	✓✓	Comparability of results between two methods, or laboratories when sample matrix is known to be extremely heterogenous.
Sensitivity	Laboratory Fortified Blank							✓✓	✓✓	✓✓	✓✓	Laboratory preparatory and analytical sensitivity and bias for specific compounds in a reference matrix at quantitation limit concentrations.
	Method Detection Limit Studies				✓✓			✓✓	✓✓	✓✓	✓✓	Statistical determination that defines the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is > zero.
	Low Point of Initial Calibration Curve									✓✓	✓✓	Instrument is capable of producing acceptable qualitative and quantitative data at the lowest concentration that sample results will be reported; the quantitation limit.

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Precision	Field Duplicates	✓	✓	✓	✓✓	✓ (VOCs)	✓	✓	✓	✓	✓	Cumulative effects of both field and laboratory precision to measure overall precision.
	Laboratory Duplicates				✓✓			✓	✓	✓	✓	Laboratory preparatory and analytical precision.
	Matrix Spike Duplicates				✓✓			✓	✓	✓	✓	Laboratory and analytical bias and precision for specific compounds in specific sample matrices.
	Analytical Replicates										✓✓	Analytical precision for determinative instrumentation.
	Internal Standards										✓✓	Instrument precision and stability.
Representa-tiveness	Field Replicates (not homogenized), also known as co-located samples	✓	✓	✓	✓✓	✓ (VOCs)	✓	✓	✓	✓	✓	Comparability of samples taken closely in time or space.

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